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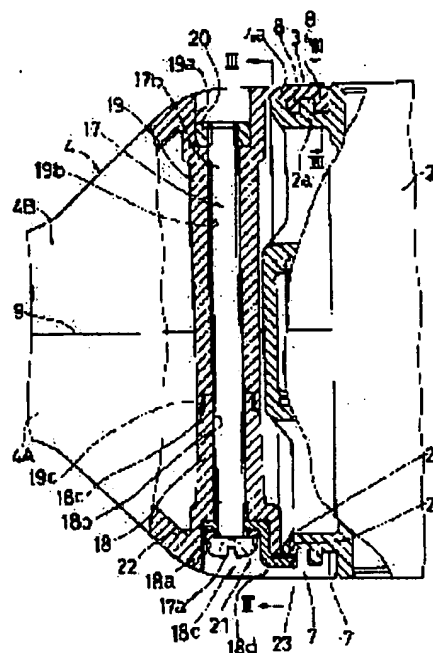
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(54) PORTABLE ROTARY TOOL

(57)Abstract:

PURPOSE: To permit the sure position fixation free from chattering in the axial direction and turning direction of a body and a handle which are connected in a relatively turnable manner and carrying out the position fixation in the revolution direction and release operation surely and easily.

CONSTITUTION: The body 2 of a portable rotary tool and a handle 4 are connected in a turnable manner by a connecting mechanism 3. The handle 4 consists of the half divided parts 4A and 4B, and the turning position of the handle 4 for the body 2 is fixed by the tightening of a tightening screw 17. Further, the handle 4 and the body 2 can be locked at a prescribed turning position by a locking member 22.



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CLAIMS

[Claim(s)]

[Claim 1] It has a body having a motor, and the handle connected rotatable through the linkage to this body. The relaxation location which permits the rotation to said body which forms said handle by the half-segmented section of the pair divided at the flat surface of the rotation shaft by said linkage which passes along an axis mostly, and binds [said] said linkage of this handle, Turn said half-segmented section of said handle mutually, bind it tight, and a movable device with a bundle is prepared in the location with a bundle which bars the rotation to said body of said handle. Furthermore, the portable rotation tool characterized by establishing the lock device which locks said handle to said body when said handle is located between said handles and said bodies in the predetermined rotation location to said body.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a portable rotation tool.

[0002]

[Description of the Prior Art] In portable rotation tools, such as the former and a disc grinder For example, as shown in the real ***** No. 61171 [58 to] official report, the handle for grasping by the body and user who build in a motor is connected rotatable. The configuration grasping by the user makes [configuration] an easy location rotate [configuration] a handle according to two working states, the working state which levels the rotary knife implement attached in the body to a work piece for for example, polish processing, and the working state which makes a rotary knife implement right-angled to a work piece for cutting processing, is proposed. The rotation device of this official report prepares the annular section which ***** to a body and handle side both at home and abroad mutually. A pin is attached in radial possible [*****] through a spring at the outside annular section. In the inside annular section It has the composition of having prepared the stopper section which fits into the hole of a major diameter from the width of face of this long slot that formed in the hand of cut the long slot which the shank of a pin inserts in in 90 degrees, and was established in the both ends of a long slot in the shank edge of a pin. If the lock to the body of a handle is performed to one side of the hole of the both ends of a long slot in the fitting condition, and the stopper section of a pin resists a spring and pushes in a pin inside, it is rotatable to a body with migration along the long slot on the shank in a handle.

[0003]

[Problem(s) to be Solved by the Invention] The rotation device of the above-mentioned conventional portable rotation tool has the following fault.

- A. Since it depends for the lock of the rotation location to the body of a handle, and a shaft-orientations location on fitting to the hole of the long slot both ends of the stopper section of a pin, it arises with [to the body of a handle] backlash, and its workability is bad.
- B. Since a pin projects outside from the outside annular section in a lock condition and is in the condition, it also has a possibility that there may be a danger that a pin will be pushed carelessly and a handle will rotate, and a pin may break.
- C. Since it continues pushing a pin until it arrives at a lock location, and rotation actuation of a handle must perform it, its operability is bad.
- D. In order to lessen attachment backlash of a handle, accurate processing is needed, and it becomes expensive manufacturing the slide contact side of the internal and external annular section.

[0004]

[Means for Solving the Problem] The body with which the portable rotation tool of this invention contains a motor in order to solve the technical problem of the above-mentioned conventional technique, It has the handle connected rotatable through the linkage to this body. The relaxation location which permits the rotation to said body which forms said handle by the half-segmented section of the pair divided at the flat surface of the rotation shaft by said linkage which passes along an axis mostly, and minds [said] said linkage of this handle, Turn said half-segmented section of said handle mutually, bind it tight, and a movable device with a bundle is prepared in the location with a

bundle which bars the rotation to said body of said handle. Furthermore, when said handle is located between said handles and said bodies in the predetermined rotation location to said body, it is characterized by establishing the lock device which locks said handle to said body.

[0005]

[Function] In the portable rotation tool of this invention, if a device with a bundle can rotate a handle to a body through a linkage, rotates a handle to a position in a relaxation location and makes a device with a bundle a location with a bundle, a handle will be bound tight to a body and the rotation location to the body of a handle will be held in an orientation. Moreover, a handle can be certainly held in an orientation by locking [in this condition] a handle to a body according to a lock device further.

[0006]

[Example] Hereafter, if one example of this invention is explained according to a drawing, the disc grinder 1 which showed the whole to drawing 1 consists of a body 2 of the hollow which built in the motor which is not illustrated, and a handle 4 of the hollow connected rotatable through the linkage 3 later mentioned to this body 2. The tip lower part of a body 2 is equipped with the abrasive disc 5 by which a rotation drive is carried out by the motor free [attachment and detachment], and, on the other hand, the trigger switch 6 for performing deactivation of a motor is formed in the lower part of a handle 4.

[0007] As shown in drawing 2 and drawing 3, the edges 2a and 4a where a body 2 and a handle 4 counter mutually are formed in annular [of the same axle which touches in and abroad mutually]. The above-mentioned linkage 3 is formed in the peripheral face of edge 2a of a body 2, is formed in the circular sulci 7 and 7 in Nijo arranged by separating distance to shaft orientations mutually, and the inner skin of edge 4a of a handle 4 corresponding to circular sulci 7 and 7, and consists of these circular sulci 7 and 7 and annular projected parts 8 and 8 which fit in.

[0008] The handle 4 is divided into the two half-segmented sections 4A and 4B by the joint 9 within the flat surface which passes along the axis of edge 4a as shown in drawing 2, and this joint 9 is in the condition that the trigger switch 6 of the half-segmented sections 4A and 4B was pinched from right-and-left-among drawing 1 both sides, almost in accordance with the center line of the above-mentioned trigger switch 6 therefore. the half-segmented sections 4A and 4B are joined in a vertical location in the anterior part with the screws 10 and 10 of a pair -- having -- moreover, a posterior part -- setting -- ***** -- in the location, it is joined with screws 11 and 12. Here, in the lateral part which approaches the joint 9 of a handle 4 as the screws 10 and 10 of anterior part are shown in the back close to edge 4a which has the above-mentioned circular sulci 7 and 7, and drawing 3, the half-segmented sections 4A and 4B are joined, the junction structure by these is the same and this junction structure is explained with reference to drawing 3 below.

[0009] In the lateral part close to a joint 9, the sleeves 14 and 15 of the shape of hollow which turns mutually and projects in the direction of a right angle to the flat surface which passes along the above-mentioned joint 9 are formed in the half-segmented sections 4A and 4B by one, respectively. The sleeve 14 by the side of half-segmented section 4A has boss section 14b of the minor diameter for insertion of shank 10b of a screw 10 which is open for free passage to boss section 14a of the major diameter which can insert in head 10a of a screw 10, and this boss section 14a. On the other hand, the sleeve 15 by the side of half-segmented section 4B has boss section 15b of the minor diameter for insertion of boss section 15a of the major diameter which fixed the nut 16 which a screw 10 screws at the pars basilaris ossis occipitalis, and shank 10b of a screw 10. In the illustrated condition with a bundle, the head 10a is stopped by the pars basilaris ossis occipitalis of boss section 14a of a major diameter in the interior of a sleeve 14, and shank 10b is inserted in boss section 15b of the minor diameter of a sleeve 15 through boss section 14b, and is screwing the screw 10 in a nut 16 very much further at boss section 15a of a major diameter. Moreover, in this condition, the point of a sleeve 14 runs in the state of a plug to the point of a sleeve 15, and the half-segmented sections 4A and 4B will be in an adhesion condition mostly in a joint 9. Such structure is the same also in junction structure with a screw 11 and a screw 12.

[0010] Moreover, the screw 17 with a bundle for being stuck to the circular sulci 7 and 7 of the body 2 which receives mutually, binds the half-segmented sections 4A and 4B tight for a handle 4, and corresponds the annular projected parts 8 and 8 by pressure is attached, and the attachment structure is explained below.

[0011] As shown in drawing 3 , in the sleeve 14 which the screws 10 and 10 explained previously insert in, the center section between 14 and the sleeve 15, and the center section between 15, the sleeves 18 and 19 of each other are really formed in the half-segmented sections 4A and 4B in the state of opposite, respectively. Namely, sleeves 18 and 19 have countered in the diameter direction of a handle 4 mutually in the direction of a right angle to the flat surface which passes along a joint 9. The sleeve 18 by the side of return and half-segmented section 4A has boss section 18b of the minor diameter for insertion of shank 17b of the screw 17 with a bundle which is open for free passage at boss section 18a of the major diameter which can insert in head 17a of the screw 17 with a bundle, and this boss section 17a like the above-mentioned sleeve 14 in drawing 2 . On the other hand, the sleeve 19 by the side of half-segmented section 4B has boss section 19b of the minor diameter for insertion of boss section 19a of the major diameter which fixed the nut 20 which the screw 17 with a bundle screws at the pars basilaris ossis occipitalis, and shank 17b of the screw 17 with a bundle. In the condition which showed in drawing 2 , the head 17a is stopped by the pars basilaris ossis occipitalis of boss section 18a of a major diameter through a washer 21 and the lockwasher 22 mentioned later in the interior of a sleeve 18, and shank 17b is screwing the screw 17 with a bundle in a nut 20 very much from boss section 19b of the minor diameter of a sleeve 19 at boss section 19a of a major diameter. In addition, although the condition with a bundle shown in drawing 2 is equivalent to the **** condition before sticking the screw 17 with a bundle to the annular projected parts 8 and 8 of the body 2 which corresponds circular sulci 7 and 7 by pressure, the point of a sleeve 18 is inserted like the above to the point of a sleeve 19 in this condition and it is in the condition Between such abutting-surface 18c which counters, and 19c, the clearance is formed slightly, and it has become the interference for binding of this clearance.

[0012] Moreover, as shown in drawing 4 , lockwasher 22 has the arm 23 of the abbreviation inverted-L character form which projects in the method of a top by one, and inlet-port section 18c of boss section 18a of the major diameter of the above-mentioned sleeve 18 is formed in an abbreviation keyhole form corresponding to this, and has 18d of narrow-width sections prolonged in back from boss section 18a. On the other hand, the edge of this edge 2a is formed in edge 2a of the above-mentioned body 2, the annular flange 24 which adjoins the circular sulcus 7 by the side of the back of the circular sulci 7 and 7 is formed in it, and the pars basilaris ossis occipitalis which is the 19d of the above-mentioned narrow-width sections has opening 25 in the part which meets this flange 24, as shown in drawing 2 . Therefore, the arm 23 of lockwasher 22 has met the peripheral surface of a flange 24 through opening 25 in the condition with a bundle of the illustrated screw 17 with a bundle.

[0013] In the condition with a bundle according [lockwasher 22] to the above-mentioned screw 17 with a bundle here As it collaborates with the flange 24 of the above-mentioned body 2 and is shown in drawing 1 , while the trigger switch 6 maintains the condition of having been located in the lower part of a handle 4 As a continuous line shows, the lock of a body 2 is attained in three locations with two vertical positions which displaced 90 degrees of abrasive discs 5 right and left to a level condition, the made horizontal position, and this location, and the configuration of such a lock device is explained below.

[0014] The projected part 26 which forms concave 26a in the external surface on which a body 2 meets the arm 23 of lockwasher 22 through the opening 25 of a sleeve 18 in the condition of having been located in the above-mentioned horizontal position as shown in drawing 5 is formed in the flange 24 of a body 2. In addition, such a projected part 26 is formed like by leaving the part which is equivalent to a projected part 26 in a flange 24, and excising the both sides partially, as shown in this drawing. It is accompanied with [of the screw 17 with a bundle] a bundle by the arm 23 of lockwasher 22, it fits into a concave 26, and locks a handle 4 in relative rotation impossible to a body 2.

[0015] Moreover, as a flange 24 is shown in drawing 3 , the body 2 has the stop slots 27 and 27 where the arm 23 of lockwasher 22 can be engaged in the condition of having been located at the above-mentioned vertical position, on the external surface of the part separated about 90 degrees on both sides of a projected part 26. These stop slots 27 and 27 are following the opposite direction side gently-sloping on the external surface of a flange 24 the side which goes to the above-mentioned projected part 26 respectively, and regulate the rotation of an one direction [as opposed to / have the radial stop side 28 mostly and / the body 2 of a handle 4] which meets an another side side on

the side face of the arm 23 of lockwasher 22 at the time of with [of the screw 17 with a bundle] a bundle. On the other hand, the stop projected parts 29 and 29 are formed in the inside of the flange 24 located in the background of these stop slots 28 and 28, respectively. These stop projected parts 29 and 29 contact the contact sides 30 and 30 formed in the hand-of-cut both sides of the edge which forms the above-mentioned inlet-port section 19c of the sleeve 18 of a handle 4 in the above-mentioned vertical position, and regulate rotation of the direction by each stop side 28 of the above-mentioned corresponding stop slots 27 and 27, and hard flow.

[0016] Furthermore, the upheaval 31 which while corresponds to the base of the circular sulcus 7 ahead located among the circular sulci 7 and 7 of the above-mentioned body 2 as for a handle 4, and projects towards the annular projected part 8 keeps spacing of 90 degrees mutually, and is formed in four places, and it is arranged at the include-angle [with one / same / of these] phase as the projection 26 equipped with concave 26a into which the arm 23 of lockwasher 22 fits. Moreover, as are shown in drawing 7 and it is shown in the circumferential direction center section and drawing 8 of each half-segmented sections 4A and 4B, in the connection of each half-segmented sections 4A and 4B, the hollows 32-32 which can fit into the above-mentioned upheaval 31-31 are formed in the annular projected part 8 of the method of top Norikazu. That is, upheaval 31-31 and hollows 32-32 fit in mutually in the horizontal position of the body 2 shown in drawing 1 , and two vertical positions. Although each upheaval 31 and each hollow 32 regulate relative rotation with a body 2 and a handle 4 by mutual fitting here in the condition with a non-bundle according [a handle 4] to the screw 17 with a bundle Upheaval 31 secedes from the fitting condition over a hollow 32 comparatively easily according to the rotation force over the body 2 of an operator's handle 4. And it has comparatively shallow fitting structure, and it exaggerates to drawing 7 for explanation, and is shown in it so that migration along parts other than the hollow 32 to the annular projected part 8 of upheaval 31-31 - 32 can also be performed convenient and rotation to the body 2 of a handle 4 can be performed smoothly.

[0017] Next, if an operation of the above-mentioned example is explained, positioning is made by fitting of the upheaval 31-31 formed in the circular sulcus 7 of the method of top Norikazu in the horizontal position of the body 2 first shown in drawing 1 , and hollows 32-32, and in this condition, as shown in drawing 4 , it will be in an insertion condition about a washer 21 and lockwasher 22 in shank 17b of the screw 17 with a bundle, and will insert in the sleeve 18 by the side of half-segmented section 4A of a handle 4. Then, as shown in drawing 2 , while lockwasher 22 contacts the pars basilaris ossis occipitalis of boss section 18a of the major diameter of a sleeve 18, the arm 23 meets the flange 24 of edge 2a of a body 2 through opening 25. Moreover, in this horizontal position, as shown in drawing 5 , concave 26a of the projected part 26 of a flange 24 is located under the opening 25.

[0018] When the screw 17 with a bundle is made to screw in the nut 20 in a sleeve 19 and is bolted from this condition, the half-segmented sections 4A and 4B of a handle 4 turn mutually, and can draw near, it is stuck to the base of the circular sulci 7 and 7 of the body 2 with which those annular projected parts 8 and 8 meet by pressure, and the rotation location of the handle 4 to a body 2 is fixed. Moreover, in connection with bolting of such a screw 17 with a bundle, the arm 23 of lockwasher 22 fits into concave 26a of the projected part 26 of the flange 24 of a body 2 through opening 25, and thereby, the rotation location to the handle 4 of a body 2 is locked, and it is held at the condition which showed in drawing 1 .

[0019] In the condition which showed in drawing 1 , the trigger switch 6 is located in the lower part of a handle 4 in this condition, and an operator can grasp a handle 4 single hand, can operate the trigger switch 6 easily, can start the motor within a body 2, can rotate an abrasive disc 5, can press down the upper part of a body 2 by another hand, can press an abrasive disc 5 against a work piece, and can do a desired polish activity.

[0020] Next, in making an abrasive disc 5 into a perpendicular condition from this condition for cutting actuation as the fictitious outline in drawing 1 shows for example, the screw 17 with a bundle is loosened, the sticking-by-pressure condition over the base of the circular sulci 7 and 7 of the body 2 of the annular projected parts 8 and 8 of a handle 4 is canceled, a handle 4 is grasped, and it applies the rotation force by the side of one of right and left to a body 2. Then, as explained previously, upheaval 31-31 secedes from the fitting condition over hollows 32-32 easily according to the rotation

force, and a handle 4 rotates to a body 2. Such rotation stops in 90-degree location by contacting the contact side 30 of the sleeve 18 of a handle 4, and one side of the stop projected parts 29 and 29 of edge 2a of the body 2 with which 30 one side corresponds, upheaval 31-31 fits into hollows 32-32 again in the location of a parenthesis, and positioning is made.

[0021] When the screw 17 with a bundle is bolted in this condition, the rotation location of the handle 4 to a body 2 is fixed by sticking by pressure to the base of the circular sulci 7 and 7 of the body 2 with which the annular projected parts 8 and 8 meet like the above in this location. Moreover, the arm 23 of lockwasher 22 engages with coincidence in the stop slot 27 on near where the flange 24 of a body 2 corresponds through opening 25. Rotation of the side which the side face meets the stop side 28, and goes to the above-mentioned horizontal position is regulated. With this and the rotation regulation operation of an opposite direction by one side of the above-mentioned stop projected parts 29 and 29, conjointly As the rotation location to the body 2 of a handle 4 is locked, therefore it is shown in drawing 1 , after the actuation has maintained the trigger switch 6 in the lower location of the easy handle 4, as a fictitious outline shows, an abrasive disc 5 can be fixed to a perpendicular condition in this drawing, and desired cutting actuation can be performed.

[0022] Moreover, although the screw 17 with a bundle is loosened like the above and hand flow is made to rotate a handle 4 to a body 2 when returning an abrasive disc 5 to a horizontal position from a vertical position In this case, if a horizontal position is arrived at, upheaval 30-30 and hollows 31 and 31 should fit in automatically, and positioning of the rotation location of the handle 4 to a body 2 should do. Actuation of carrying out fitting of the arm 23 of the consecutive lockwasher 22 to the concave 26 of the flange 24 of a body 2, and actuation with a bundle of the screw 17 with a bundle can be performed easily.

[0023] Since the engagement condition over concave 26a of the arm 23 of the above-mentioned lockwasher 22 or the stop slot 27 can carry out a direct check by viewing from the exterior through inlet-port hole 18c of a sleeve 18 here, lock actuation can be ensured. Moreover, edge 4a of a handle 4 is in the condition of having overlapped mutually on the same axle to edge 2a of a body 2, in the linkage 3. Furthermore, since the opening 25 prepared in the handle 4 for the stop by the arm 23 of lockwasher 22 is also closed by this arm 23 and edge 2a of a body 2 is located in that inside, Invasion is beforehand prevented into the body 2 of the foreign matter from the outside etc., or the handle 4.

[0024]

[Effect of the Invention] In the portable rotation tool of this invention, since location immobilization to the body of a handle is performed with [between the handle half-segmented sections] a bundle, positive station keeping which is not with backlash in any of shaft orientations and a hand of cut can be performed. Moreover, the device with a bundle does not need to prepare the member which can operate it easily since it is only loosening with [between the handle half-segmented sections] a bundle in this way, and projects in the exterior of a body or a handle. Moreover, by having established the lock device which locks a handle by the position to a body separately from especially the above-mentioned device with a bundle, in addition to maintenance by the device with a bundle, station keeping of a handle can be performed to a duplex, and it has the advantage which can prevent certainly the rotation of a body to the handle under polish or cutting.

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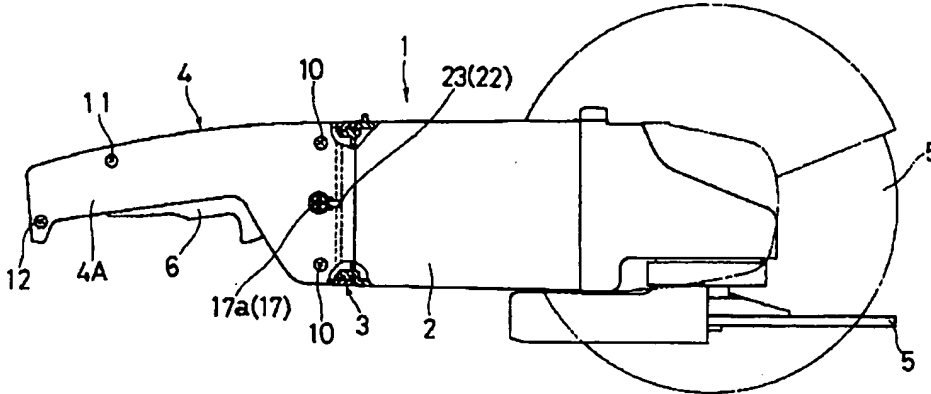
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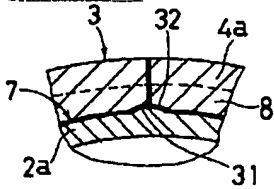
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DRAWINGS

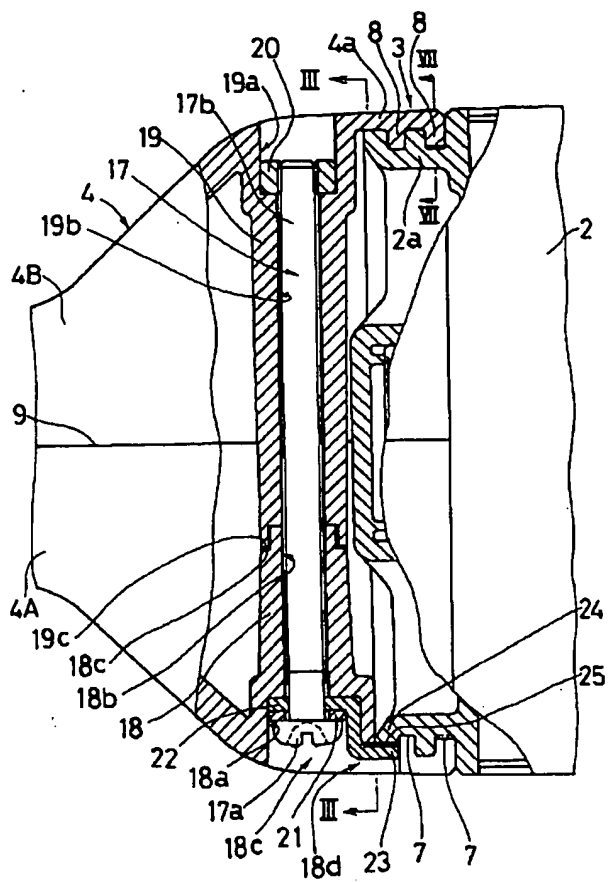
[Drawing 1]



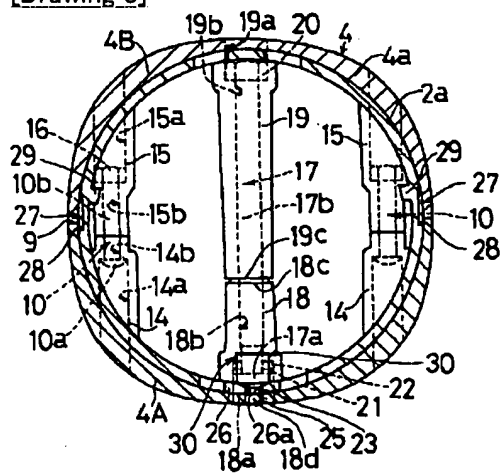
[Drawing 8]



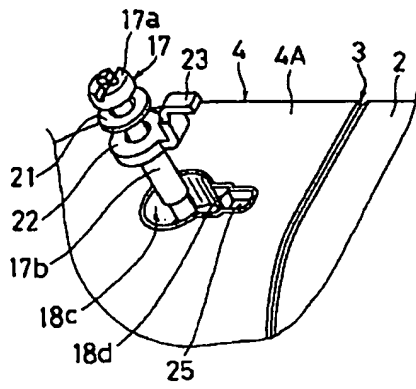
[Drawing 2]



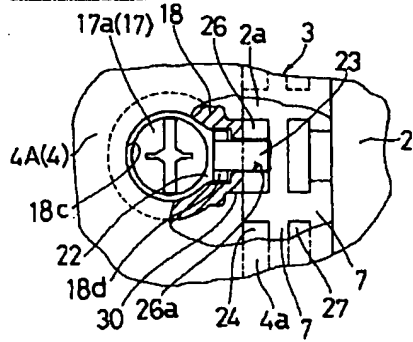
[Drawing 3]



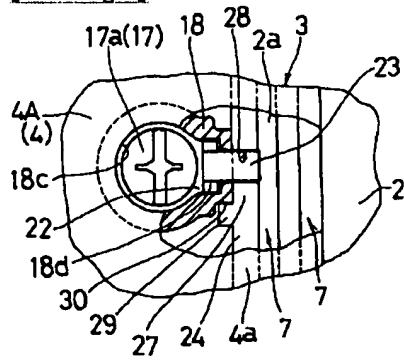
[Drawing 4]



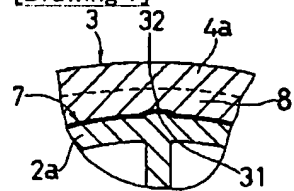
[Drawing 5]



[Drawing 6]



[Drawing 7]



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